Energy Policy 158 (2021) 112577

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

# Rowing, steering or anchoring? Public values for geothermal energy governance

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ARTICLE INFO

*Keywords:*
Geothermal energy
Public values
Publicness
Public action
Governance
Energy transition

ABSTRACT

Energy transitions require a rethinking of the role of public authorities to integrate public views and concerns. Through a case study in Geneva, Switzerland, this article examines how the public sees the role of the public authority in the transformation of a local energy system by developing a canton-wide geothermal program. We use a public values perspective, identifying public values linked to the roles and responsibilities of the state. Analyzing public values allows understanding how the public perceives state actions and consequently how the authority may adequately respond and accommodate these expectations and doing so, anchor policies in public values. We begin by exploring the concepts of public value and posing the contextual background. The article then presents the most salient public values linked to the roles and responsibilities of the authorities based on focus group data. For residents the most important function of the public authority in relation to energy transitions is to inform and raise awareness. Other important functions are providing financial support and regulating. Acknowledging the importance of communication and its associated values allows public authorities to set the anchor to then effectively roll out, plan or support energy transition projects.

## 1. Introduction

Transitioning energy systems to less greenhouse-gas-intensive technologies not only depends on the successful development and implementation of new renewable energy technologies but also on the way they are received and whether they are approved by the public (Poortinga et al., 2013). Thus, the role of the public cannot be disentangled from energy transition considerations as the public can accelerate or prevent the development of new energy technologies (Bidwell, 2016; Devine-Wright, 2011). Trust, social acceptance, values, and cultural preferences are critical to the adoption of new technologies (Fouquet and Pearson, 2012). In responding to the challenges of public participation and in light of the complexity and diversity of actors and viewpoints, low-carbon transitions are considered to require much greater governmental encouragement in different forms than most past transitions (Fouquet and Pearson, 2012). To deal with controversies stirred up by new technologies, policy makers can develop conditions and procedures supporting collective deliberation (Swierstra et al., 2009). Mission-oriented innovation policies conducted in this way may enable a system-wide transformation across different sectors, bringing different actors together in new ways (Jütting, 2020; Mazzucato, 2018; Mendonça et al., 2018).

Opening up the energy transition to a wider group of actors, including citizens and civil society organizations, and involving them in the definition of the mission requires a rethinking of the notion of public value, going beyond what is understood as the "public good" (Mazzucato, 2018). Public values are a useful notion as they are informative regarding the rationales upon which opinions and preferences about public matters are based. Barry Bozeman, one of the key proponents of the public values concept, defines them as values providing "normative consensus about the obligations, rights and benefits of citizens and of the state, as well as on the principle on which the government is based" (Bozeman, 2007). Viewed in this way, public values are essential to understanding public preferences and acceptance or disapproval of energy policy options. Moreover, they can reveal why preferences are formed as such (Butler et al., 2015).

The uncertainty linked to public preferences is particularly prominent around energy system issues, where the public tends not to have fully formed views (Demski et al., 2015). This uncertainty may be tackled by incorporating public perspectives in the development of pathways toward low-carbon systems (Butler et al., 2015). Demski et al. (2015) identified 15 values that constitute what they call a "public value

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https://doi.org/10.1016/j.enpol.2021.112577
Received 22 September 2020; Received in revised form 25 June 2021; Accepted 2 September 2021

system for energy system change.“ They highlighted that the values constituting this system go beyond technological or ecological aspects to include cultural and social issues. Furthermore, they stress that these values can be activated by specific technical aspects of the energy system. According to the authors, understanding this value system enables anticipating and understanding public reactions to energy topics (Demski et al., 2015).

Anchoring political decisions by taking into consideration public values and local contexts can lead to increased legitimacy of system transformations. Careful attention to public values facilitates making new technologies more relatable to local and contextual conditions that are important to specific communities (Dignum et al., 2016). The literature on place attachment has shown the importance of taking into account and being responsive to such local specificities when planning and implementing energy projects (Devine-Wright, 2009).

However, when it comes to emerging issues related to technologies linked to complex transformations such as energy transition and decarbonization to address climate change, it is unclear which public values are central. Public decision-making needs to be able to create new ways to identify and take into account these values through new forms of stakeholder and public engagement (Taebi et al., 2014). To do so, it is necessary to understand the dynamics of how public values around energy issues become constituted.

This article contributes to debates about how public values associated with emerging energy technologies are influencing the development of these technologies and how public authorities should take these values into account. It focuses on a case study about the development of a geothermal energy program initiated by the cantonal authorities and the local public utility in Geneva, Switzerland. Based on participant observation and focus group research, the article identifies key public values linked to the development of the geothermal energy technology as a public mission, both in terms of content and process. Thus, we ask 1) What public values drive and constrain public actions for geothermal energy development? and 2) What roles and responsibilities can authorities[1] take to address these public values?

## 2. Conceptualizing public values: from rowing to steering, to serving, and, finally, to anchoring

### 2.1. Rowing, steering, and anchoring: the changing roles of the public authority

The roles and responsibilities of public authorities constantly change and evolve, and so do the concepts and theories that refer to them. During the industrial era—what is sometimes called the era of “old” (Denhardt and Denhardt, 2000) or “traditional” public administration (Bryson et al., 2014)—the mission of public administration was to rule, regulate, and control in a hierarchical and bureaucratic way (Osborne and Gaebler, 1992). The role of the government was referred to as rowing (Osborne and Gaebler, 1992), in the sense of “designing and implementing policies focusing on a single, politically defined objective” (Denhardt and Denhardt, 2000), with the elected officials primarily having the power to make these decisions (Bryson et al., 2014).

Since the 1980s, “New Public Management” (NPM) has been brought forward in opposition to the “old public management” (Gow and Dufour, 2000), criticizing the latter’s bureaucracy and concerned with its ability to efficiently, economically, and effectively provide for public services (Osborne and McLaughlin, 2005). Rather than rowing, the new role of the government is to steer, acting as a catalyst to unleash market forces by running the government like a business (Denhardt and Denhardt, 2000; Osborne and Gaebler, 1992) and pushing away from centralized government agencies to hand over the oars to markets and competition (Bryson et al., 2014). Many scholars and practitioners challenge NPM (Bozeman, 2002a; Bryson et al., 2014; Denhardt and Denhardt, 2000, 2015; O’Flynn, 2007), arguing that it is incapable of altering certain basic dilemmas of public administration regarding risks such as human error, system failures, fraud, or corruption (Dunleavy and Hood, 1994). Others criticize the one-sidedness of “managerialism” as being ill-suited to the public sector (Kickert, 1997) and leading to the fragmentation of relationships, thus further spurring destructive behavior (O’Flynn and Alford, 2005).

Such criticism has led to an alternative normative model called the “New Public Service” (Denhardt and Denhardt, 2000, 2015). Instead of rowing or steering, the New Public Service’s mission is to serve the citizens and meet their shared interests by creating shared values (Denhardt and Denhardt, 2000). In contrast to NPM’s focus on economic interests and values, the New Public Service places citizens, citizenship, and the public interest at the forefront (Denhardt and Denhardt, 2000). Bryson and colleagues further build on this model, claiming that a renewed attention to values goes beyond “efficiency” and “effectiveness” to include the full range of democratic and constitutional values and to comprise what they call “Public Value Governance (Bryson et al., 2014).

Crawford (2006) and Loader and Walker (2006), focusing on policing and security provision in the context of the changing roles of the state, propose complementing the steering and rowing analogy used to describe the public authority’s roles by adding an anchoring metaphor, which describes the ways in which the state can provide public service in a deregulated context. Public Value Governance can be seen as a means of anchoring public policies within a local context and adapting public management and governance instruments to pressing topics at appropriate scales. In the public values literature, the notion of publicness describes the extent or degree to which public organizations or policies subscribe to public values (Antonsen and Beck Jørgensen, 1997; Moulton, 2009). The public will perceive government actions and decisions positively or negatively depending on how well they are in accordance with public values held in their specific community. This publicness is not given once and for all, and defining the publicness of authorities has always been a struggle for public administration theory (Pesch, 2008). Different cultural, political, and legal contexts have practical implications for public value discourse (Meynhardt et al., 2017). Primarily addressing the U.S. context, Bozeman attributes a special role to the government as a guarantor of public values, emphasizing, however, that private actors may also have public value obligations (Jørgensen and Bozeman, 2007). In some contexts however, public values might favor relationships based on market mechanisms or consider that social life should be based on individualism alone, leading to different understandings of publicness.

Taking this approach one step further, the idea of anchoring implies identifying the public values upon which a public policy should base itself. For this, public values related to processes are just as important as those pertaining to content. So-called procedural public values refer “to the way the public sector should act and to standards that the process of government action should meet” (de Bruijn and Dicke, 2006), whereas substantive public values are those that latently exist in society and that a state is responsible, either directly or indirectly, for safeguarding.

Several theoretical perspectives spanning different disciplines recognize the importance of understanding public policy support at the individual level and invoking values to explain preferences, attitudes, and opinions. Some perspectives explain values as worldviews or symbolic attitudes (Stoutenborough et al., 2013); others view them as antecedents to beliefs that, in turn, influence attitudes (Bidwell, 2013); and still others assess individual values to understand environmentally consequential behavior (Dietz et al., 2005). What distinguishes public

[1] In this paper, we use the terms “public authority” or “the authorities” when speaking about the public hand, which, depending on the context, may refer to “the municipality,” “the canton,” “the cantonal department,” “the cantonal/municipal politician,” “the administration,” and more. In cases where the focus group participants specify who they refer to when talking about “the authority,” we explicitly state it.

values from these conceptualizations is that they refer to values that are held in common about "things public" (Bozeman, 2007).

### 2.2. Public values and geothermal energy

Social science research on energy issues has used different conceptualizations and frameworks to show the importance of values to understanding technology acceptance, willingness to change practices, as well as views on transitioning energy systems (see, for example, Butler et al., 2016; Fouquet and Pearson, 2012; Steg et al., 2015; Visschers and Siegrist, 2014). Energy scholars have started paying attention to public values as a steppingstone to develop governance for energy transition. Mitchell et al. (2015) advocate for public value energy governance (PVEG) (or public value regulation; see Mitchell and Woodman, 2010) that rebalances institutional power to better suit the needs and realities of the current energy system. This governance model relies on greater involvement of stakeholders, claiming that "[s]ocial legitimacy is a fundamental requirement of managing the complexities of rapid technological change." The benefits of involving the public and giving them a voice are not new, and scholars have discussed similar approaches for decades in conjunction with controversial energy infrastructure projects to resolve conflicts rooted in values (such as Renn's analytic-deliberative decision-making process [Renn, 1999]). Although there is a growing group of scholars linking public values to renewable energy technologies (for some examples, see Künneke et al., 2015; Pasqualetti and Schwartz, 2013), community energy programs (Hoffman et al., 2013), and energy transition more broadly (Butler et al., 2015; Demski et al., 2015; Edens and Lavrijssen, 2019; Mitchell and Woodman, 2010), to date, no research has been conducted on public values in relation with geothermal energy.

Geothermal energy is a renewable energy technology exploiting underground sources of heat. This heat can be used directly for different applications (e.g., heat pumps, greenhouses, industry, and district heating networks) or for generating electricity if the temperature at the surface exceeds 100°C. Geothermal energy relies on different types of technology to harness the heat stored in the earth's crust. Some geothermal systems characterized as hydrothermal exploit existing aquifers. Their productivity depends on the temperature and flow rate of the water in these aquifers. Enhanced geothermal systems (EGS) require the creation of artificial reservoirs through hydraulic fracturing or other methods of stimulation. Brine or water is then injected into the reservoir and extracted again, laden with the underground heat (Swiss Seismological Service, 2016).

Several geothermal energy projects across the world have been associated with induced seismic events (see Ejderyan et al., 2019; Grigoli et al., 2018; Trutnevyte and Ejderyan, 2018). While EGS are more prone to induce earthquakes, such events have also been linked to hydrothermal systems. Adding to the risk of induced seismicity associated with geothermal energy technology, other factors come into play that have implications on the public's view and acceptance of this technology, such as the financial risk related to the successful implementation of the technology, as well as more general issues linked to the siting, scale, and impact of individual projects. These issues must be debated publicly in relation to expected benefits (Giardini, 2009; Trutnevyte and Ejderyan, 2018).

A growing body of social science studies shows that geothermal energy developments closely interact with the social context in which they are located (Canan, 1986; Chavot et al., 2018; Ejderyan et al., 2019; Vargas-Payera et al., 2020). Chavot et al. (2018) argue that public attitudes and controversies related to geothermal energy projects depend on how well "anchored" in a local setting these projects are. Studying geothermal energy development in Alsace, they highlighted the role of various factors, such as whether a project is being carried out by a local public utility or an international operator, its alignment with local development plans, or the way it addresses risks.

The development of geothermal energy may be undertaken by entities in the public or private realm, depending on the scope, drilling depth, and technology employed. Pertaining mostly to private installations, near-surface exploitation of subterranean heat by means of heat pumps is very common in Switzerland (Lund and Toth, 2021). Geothermal projects relying on drilling technologies that allow deeper access to the earth's crust are often undertaken within the public realm and fall under regulations on deep underground usage (Thaler et al., 2019). In Switzerland, up until the time of writing, no electricity has been produced using deep geothermal sources. Two flagship projects in the cities of Basel and St. Gallen had to be abandoned in the past due to earthquakes (Ejderyan et al, 2019, 2020). While these events were setbacks for geothermal development in Switzerland, they did not lead to the abandonment of the technology. Based on its Federal Energy Strategy 2050, Switzerland is counting on geothermal energy, together with other renewable energy sources, to phase out nuclear power plants.

Identifying public values linked to geothermal energy facilitates a better understanding of the socio-technical dynamics and the public's perception in the field. Our research on public values in the context of a geothermal energy program contributes to the Public Value Governance approach and introduces the anchoring metaphor as a means to understand the role of the public authority in a rapidly developing environment such as energy transition. In the following, we briefly explain the research background and how we identified public values. We also show how the chosen methods are pertinent to perceiving the role of the public authority before we dive into the results and operationalize the anchoring metaphor.

## 3. Approach

The setting of our research project is a geothermal program managed by the Cantonal Office of Geology, Soil, and Waste Services (GESDEC) and the Cantonal Energy Office (OCEN) of the Canton of Geneva and the local public utilities. The public utilities of Geneva are an independent public law institution owned by the Canton of Geneva and its municipalities. The geothermal program management team is composed of representatives of the two cantonal departments and the public utilities. The driving force is the state, which determines energy policies. The public utilities refer to themselves as the "industrial arm" (Perruchoud, 2020) of the state, in charge of implementing the energy policies and, with them, the geothermal program. The program plan is to be implemented gradually. Its first phase is dedicated to prospecting and exploring for geothermal resources at different levels of depth. After identifying resources, the plan is to drill exploratory boreholes that will go deeper and deeper into the earth's crust at various locations in the canton. Instead of finding an optimal site for a single geothermal project, the aim of the cantonal program is to assess the geothermal potential throughout the territory and select different sites for possible geothermal applications. The initial aim is to develop only hydrothermal applications. Therefore, location and suitable underground conditions are of crucial importance. Program managers insist that they must deal with more than just geology and that it is essential to anchor the program in the Genevan territory, in the sense of coupling underground geothermal potential with surface needs (Ruef et al., 2020). The program also claims to foster institutional innovation, arguing that developing a new technology—and hence creating new value chains—requires the public authority to create appropriate socioeconomic conditions. This, in turn, requires not only public acceptance but also local operators, investors, and new regulating bodies who can carry out the projects (Ejderyan et al., 2020).

This research is part of a project funded by the Canton of Geneva and the public utility that aimed to identify how a new energy technology such as geothermal energy can become embedded in the Genevan territory. The project approached this question by looking at how to embed the geothermal program within existing administrative structures and among the population through participatory measures. We were especially interested to see how actors would argue either in favor of or

against an emerging technology and how they would link it to collective concerns and expectations. The project relied on document analysis (project documentation, communication materials, and media), participant observation of management meetings of the geothermal program, and focus groups with residents of the Canton of Geneva. The participant observation of the management meetings and the focus groups enabled us to observe how actors argue in public either in favor of or against geothermal energy. In this paper, we present the results of the focus groups, which reveal the importance of public values for the development of geothermal energy in Geneva. We use insights from the document analysis and the participant observation to interpret and discuss the results of the focus groups.

We conducted six focus groups with 6–10 participants each ($n = 52$) in different municipalities and neighborhoods across the Canton of Geneva (see Fig. 1). We chose this method as, at the time of our study, there was no ongoing participatory process or local information campaign about geothermal energy in Geneva. We wanted research participants to develop and discuss arguments either for or against geothermal energy in a collective setting. We chose the focus group locations based on a maximum variation principle in order to cover municipalities with different sociodemographic characteristics and different relationships to geothermal energy. We recruited participants by putting advertisements on boards in public buildings, supermarkets, and public transportation stops and by asking municipalities, neighborhood associations, and local NGOs to announce the focus groups in their newsletters or through direct mailing to their members. The advertisements indicated that the participants would receive a 40 CHF (approx. 40 USD) gift card as a reward. Even though the method is not aimed at generating statistical representativity of the whole population, it is important to note that among the participants, there was an overrepresentation of males, people with higher education, and homeowners. The focus groups also revealed that most of the participants were actively involved in their communities, either as members of resident initiatives or by regularly asking questions to local officials. The results are still significant as participants with this profile are also those who are most likely to engage in either active support of or opposition to geothermal energy projects.

All participants signed written informed consent agreements that assured confidentiality and anonymity before starting the discussions. All focus groups were conducted in French and organized around three focusing exercises. The first asked them to imagine how they would support a local energy transition initiative. The second had them react to a video on the energy history of the Canton of Geneva produced by the geothermal program. The third exercise had them react to videos about the potential development of geothermal energy in Geneva. The videos and prompts led to lively discussions on preferred energy systems, the role of the authorities, desired ways of engagement, and many more related topics.

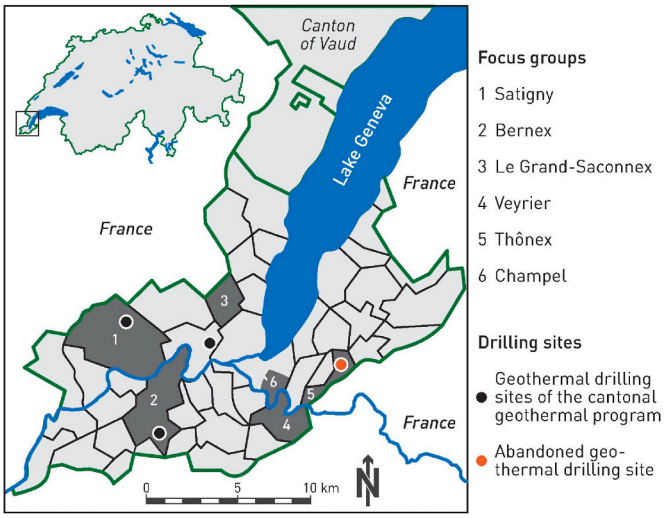


**Fig. 1.** Focus group locations and geothermal drilling sites.

The focus groups lasted about 2 h each. They were recorded and transcribed integrally. We conducted an open-ended qualitative content analysis inspired by grounded theory (Strauss and Corbin, 1998), using QSR NVivo software. All transcripts were coded by the first author. The coauthor, along with two research assistants who helped organize the focus groups, coded part of the transcripts and discussed the overall coding scheme. We first identified salient categories of statements by coding and categorizing the full transcripts. We noticed that participants repeatedly brought up the roles and responsibilities of the cantonal authorities. This resonated with observational data of the strategic management meetings of the geothermal program, which revealed continuous discussions about the role of the Canton of Geneva and the public utility. These discussions focused on what authority the canton has to "oblige" residents to connect to an existing district heating network or how and when the population needs to be informed about upcoming drilling projects, among other topics. The geothermal program managers questioned the legitimacy of imposing certain behaviors or decisions on the citizens to boost one form of renewable energy. In scrutinizing these concerns, we identified many statements about different types of values that had to be considered when developing geothermal energy. These observations resonated with the notion of public values, which enabled us to link these discussions with the overarching project goal of assessing how well geothermal energy can be anchored (or not) in a certain territory. We thus conducted a second round of focused coding to identify public values systematically.

First, the topic of geothermal as a relatively novel renewable energy source, combined with the fact that in Geneva, the geothermal program is managed by a public authority, led to a growing interest in the role of the former during the meetings. Secondly, based on focus group data, we decided to systematically identify public values linked to the role of the public authority for various reasons. Since public values are considered as existing latently in society (Bozeman, 2007) and constructed through social interactions (Demski et al., 2015), focus group discussions are a suitable tool to identify such values. During the discussions, participants were asked to justify their opinions in interaction with other participants. In this way, a deeper understanding of the statement could be achieved and normative assumptions revealed (Bloor et al., 2001).

Organizing our data by a process of labeling different themes and relationships between them, we identified all public values that were both explicitly and implicitly mentioned during the focus groups. Here we used public values identified in the literature, but expanded these with public values emerging in our study. Since the range of topics discussed in the different focus groups varied widely, using a public value approach allowed us to uncover the deeper ideals and concerns that span different topics and contexts and underpin the residents' opinions (Butler et al., 2015). Correspondingly, with the focus on the role of the public authority, the public values identified through the focus groups represent a set of general positions that underlay the particular viewpoints of our participants (Butler et al., 2015). Even though public values are shared, this does not mean that every citizen embraces them and agrees on their exact nature (Bozeman, 2007; Bozeman and Sarewitz, 2011). In line with this, we did not weigh the public values in terms of whether the participants referred to them positively, negatively, neutrally, or ambiguously, or whether there was general agreement or disagreement on their content, as this would not have been representative of the distribution of such attitudes among the Genevan population. Instead, we indicate whether specific aspects related to the public values we identified were connoted positively or negatively or were contested when discussing our results.

## 4. Findings

We conducted an initial categorization based on the distinction between substantive and procedural public values (de Bruijn and Dicke, 2006) that we classified into two groups:

- values that drive or constrain public actions for geothermal energy development and
- values about the roles and responsibilities of the public authority.

Whereas the second group is directly linked to the actual actions and characteristics of the authority, the first category looks at the values that come into play in the general setting of public intervention. In other words, what are the conditions or larger background ideas at play that, in turn, influence the public authority's actions, spheres of influence, priorities, and characteristics?

### 4.1. Values driving and constraining public actions for geothermal energy development

In all six focus groups, 125 references to drivers and constraints of public action were coded. These are all references to factors, conditions, or settings that influence (or should influence, according to the focus group participants) the authority's actions in the public space, either directly and consciously or indirectly and unconsciously. They refer to what are sometimes termed "substantive" public values (de Bruijn and Dicke, 2006). Through qualitative coding, we identified eight different public value clusters containing values driving and constraining public intervention (Table 1). Five of the value clusters were identified in all six focus groups, and the remaining three were mentioned in all but one focus group. Thus, these values span various locations and participants in diverse group dynamics and discussions in which they were referenced.

Interlinkages between value clusters are very common, both among drivers and constraints of public intervention and roles and responsibilities of the authorities. Thus, looking at combinations of values is crucial to understanding a public value accurately. For example, **environmental sustainability** values are repeatedly considered in relation to **localness** values. In discussions on the preferred energy resource, several focus group participants in different localities mentioned a preference for local energy resources and, as a last resort, what they called "environmentally friendly" imported energy resources, such as offshore wind power. **Environmental sustainability** values are almost always combined with others, such as considering the **diversity of options** of renewable energy, the need to coordinate with others (**bringing people together**), as well as **learning from the past**. The same applies for the **thinking beyond political constraints** cluster, where the linkages are vital to understanding what the constraint is actually about. Here, linked public values include **acting reasonably, appropriately**, or **economic benefits**.

The identified values are not new as such, as similar descriptions and value terms can be found in the public value literature, for example, in the widely cited Public Values Inventory by Bozeman and Jørgensen (Jørgensen and Bozeman, 2007) or, for energy-related values, the value clusters identified by Demski et al. (2015). Jørgensen and Bozeman use the terms "competitiveness" or "shareholder value" to describe similar values (Jørgensen and Bozeman, 2007). However, the most interesting values are the ones that might not make it onto every public values inventory because they pertain to a very local context; these provide deep insights into how the public perceives its surroundings.

Thus, it is to be expected that economic values will rise to the surface, but how and linked to which other values? We observe that **economic benefits** are mostly referred to in terms of long-term aims. In other words, residents often emphasized the importance of having a long-term vision while taking risks in the short term (**investing for the long term**).

**Table 1**
Values driving and constraining public intervention.

| Value Cluster - Description | Values | Illustrative quotes |
|---|---|---|
| *Quality of energy resources and public infrastructures* Values linked to landscape quality elements like aesthetics and cleanliness. Either explicitly linked to energy resources or public infrastructures or quality of life more generally. | Aesthetics | "Yes, like one did not install solar panels, because it was not aesthetic." (FG1) |
| | Cleanliness | "So we can for example decide to make a real shift towards gas in terms of imports. To avoid closing the door to energy imports. But to orient it towards what is cleaner, more virtuous, and on what is available for import." (FG6) |
| | Regularity | "The first thing to do (…) is to encourage building owners to put photoelectric cells on the roofs. It would not damage the landscape, it would not be seen, and in addition, it provides regular energy." (FG6) |
| *Autonomy and choice* Values linked to dependencies and the consequent strive for independence of certain (energy) resources. | Independence | "Bringing energy production back to the local level removes that dependence a little bit …" (FG2) |
| | Diversity of options, initiatives, renewables | "Above all, you have to have different sources. Ehm, not only geothermal energy, but wind turbines … a range of solutions." (FG6) |
| *Environmental Sustainability* Values linking public actions with environmental considerations. | Avoiding negative impacts | "Favor local production insofar as this, eh, does not have too much negative impact on the environment." (FG6) |
| | Environmental consciousness | "But if everyone starts to think for the better of the environment, because everyone is aware and everyone has a, ehm, shares the same state of mind, then it could work." (FG6) |
| *Thinking beyond political constraints* References to public action that is inhibited, hindered or slowed through conditions and rules of the political system in place. | Transgressing … electoral cycles | "I think that in politics, there are changes of governments which are a constraint … A legislature only lasts for the duration of a legislature. Then you have to change people, and you have to come back … that's a problem!" (FG6) |
| | … political mandates | "It they go until the end and in an honest way, because very often they lose their senses (*free translation of French expression*), these people, before and after the elections." (FG3) |
| | … party battles | "An idea that will come from right or left will be systematically countered by the opponent clan. And there, we break the whole dynamic of global thought, |

(*continued on next page*)

**Table 1** (*continued*)

| Value Cluster - Description | Values | Illustrative quotes |
|---|---|---|
| | | of global interest, simply for small political quarrels." (FG2) |
| | … political inertia | "But at some point, we have to take action guys, because as long as we spend our time discussing, it's like soccer games, we can chat for twenty years if he scored or if he did not score." (FG4) |
| | Publicness | "… Is there a possibility of enshrining this type of project with a public-private institution or a public-private partnership which is a little bit detached from precisely this change and political insecurity?" (FG6) |
| *Localness* Different values that an authority is expected to consider with an explicit local character. | Producing locally | "I really agree with the fact that we have a territory that can (…) allow us to do better, to be less dependent also on buying energy, because there is what we produce and what we do well here." (FG3) |
| | Local characteristics | "Geothermal energy in the canton of Geneva is not the same everywhere. So if it has to be pushed, well it will be pushed in some places and not necessarily in others." (FG1) |
| | Adapting to local needs | "However, the municipalities must know the specific needs of each. Each municipality has its specific needs and then there must still be room for maneuver to be able to do targeted things." (FG3) |
| *Economic benefits* Values pertaining to economic framework conditions influencing or laying the grounds for public action. Macro-level values linked to long-term visions and the question of opening up the energy sector for competition. Micro-level arguments on savings and individual economic conditions. | Investing for the long-term | "I am aware that it is a great investment, but in the event that the city can invest, it could be very profitable in the long term." (FG6) |
| | Cost savings | "The savings (…) will take several decades to pay off. That is to say when they will be reimbursed, in a long time, (…) we will have to change for something else …. This is not cost saving!" (FG3) |
| | Competitiveness - cooperativeness | "I would be tempted to say that we still need private involvement when it comes to assessing the long-term viability of the project. It must not be exclusively public and we must also keep the idea of being able to compare, to be able to compete, to be able to see what is there, what is healthier in the long term. (…) So, public involvement is essential, but I think it shouldn't be exclusive." (FG6) |
| *Responding to grand challenges of the time* Values linked to the urgency and necessity of the moment to act on climate change issues, change energy provisions and turn words into action. | Necessity | "So at some point, you have to do tests anyway. (…) So that we can move forward, because we don't have so many other solutions." (FG3) |
| | Urgency | "Afterwards, the problem we are facing is that it is also an emergency. It is the urgency of the problem and the environmental theme both at local level and …" (FG6) |
| *Familiarity* Values linked to how messages of the public authorities are best received by the population - linking it to what they are familiar with. | Trust | "Is it necessarily more objective if something is said by someone close to you or someone from far away? I don't know. But the impression we have is that we almost want to trust him." (FG2) |
| | Proximity | "If they organize an event to communicate about energy and energy consumption, why not also link it with the environment in which we live." (FG6) |

Timing is also crucial for the **thinking beyond political constraints** value cluster. The limit in terms of time and how this restriction influences the politicians' commitment to a long-term project like geothermal describes a dilemma that is sometimes referred to as the "governance trap" (Becker et al., 2019; Pidgeon, 2012), where the government is expected to act but feels constrained from bold action due to the electoral cycle (**transgressing electoral cycles** and **political mandates**). The following quote shows this dilemma nicely:

> Participant FG6: "I suppose that the basic investment must be quite heavy, and obviously, when it is necessary to justify in front of the taxpayers the installation of a system like this, ehm, the political time, the time of the elected politician, is limited to the prospect of a mandate. Whereas the amortization time of an expense like this, drilling three kilometers into the ground, well, is a little longer than a mandate. And so, there is also the risk-taking for policy makers …" (translated by FR).

Linked to the timeframe element, some participants talked about mitigating the risk due to time limits by enshrining the project by creating a public-private institution (**publicness**). In fact, this discussion came up in four of the six focus groups. As the geothermal program is managed by the canton and the public utility, which is a publicly owned entity, participants criticized the fact that there is no competition or free market. Focus group participants did not agree on the degree of "publicness" of the local public utility. Some regarded the public utility as a private organization as it is supposed to operate following market rules. Others found the public utility to be linked too intimately to cantonal agenda and policy objectives and, thus, regarded it as a governmental department.

Having identified what limits and drives public interventions and actions, we now move to unpack the perceived roles and responsibilities of the public authority.

### 4.2. Values related to roles and responsibilities of the public authority

Referring to the way the public authority should act and the standards that the process of government action should meet, this second group is comprised of procedural public values (de Bruijn and Dicke, 2006). We identified 191 references to roles, responsibilities, and characteristics that were either expected of or viewed as related to the public authorities. Through qualitative coding, we organized the references into five different public value clusters, as shown in the first column of Table 2. The public values composing these clusters (Table 2, second column) pertain to different scales of action and abstraction and need to be analyzed in their context. While the drivers and constraints discussed above pertain to contextual factors that shape the public authorities' actions and responsibilities, this second group of public values directly links to these actions, characteristics, and responsibilities of these authorities.

The focus group participants were quite explicit when referring to actions expected of the authority. Close examination of our data revealed a connection between the roles and responsibilities of the authority with the three prominent roles in the public management literature introduced in the beginning of this paper: *rowing, steering,* and *serving*. Table 2 (columns 3–5) shows the distribution of these roles across the identified public values, thus indicating, when talking about these different values, which public management form the focus group participants were referring to when describing the public authority's actions. The numbers in the table refer to the instances in which these values were mentioned during the focus groups. Many references by focus group participants touched on several public values at the same time, which is why the total number of instances attributed to the different public management forms is higher than the total references identified in the focus groups.

Some references to actions, roles, and responsibilities are clearly attributable to one dominant public management form, while others might take place via two or three public management forms, depending on the context and the way the actions are implemented.

**Table 2**
Roles and responsibilities of the public authority and the governance forms they were associated with. The numbers represent the number of statements identified as discussing a rowing, steering, or serving governance style in relationship to the public value in question.

| Value Cluster | Values | Rowing | Steering | Serving |
|---|---|---|---|---|
| Values pertaining to regulatory functions | Investing on public infrastructures | 3 | 6 | 1 |
| | Providing financial incentives | 1 | 11 | 3 |
| | Providing public investments and subsidies | 2 | 15 | 9 |
| | Regulating - deregulating | 8 | 24 | 2 |
| Values pertaining to the relationship with the public | Bringing people together | 2 | 10 | 7 |
| | Granting access to information | 3 | 35 | 44 |
| | Reassuring | 0 | 0 | 5 |
| | Responding to different needs | 2 | 0 | 3 |
| | Value well-being of public | 0 | 1 | 3 |
| Values pertaining to taking initiatives | Being exemplary | 3 | 7 | 4 |
| | Wasting less energy | 1 | 10 | 7 |
| | Seizing opportunities | 3 | 4 | 3 |
| Values pertaining to cautiousness | Acting reasonably, appropriately | 2 | 10 | 7 |
| | Identifying the "right" scale of action | 2 | 6 | 4 |
| | Learning from the past | 1 | 0 | 0 |
| | Taking step by step | 0 | 8 | 7 |

References to **regulation or deregulation** described actions of the government with a dominant *steering* character. Here, the range of discussed topics is wide, including light bulbs, standards for new buildings, waste taxes, and deposits on bottles, just to name a few. However, the most interesting discussions around this *steering* role of the public authority revolved around the advantages and disadvantages of the "public" nature of the authority and its ability to make impositions and regulate in this role. The following discussion between two focus group participants illustrates this:

> Participant A: "And also, we are sure that if it is the state who does it, that it will not just do it to earn money. It will take all the … it will consider all the parameters necessary to make decisions. But it's not like that with a private company."
>
> Participant B: "I sometimes find it regrettable that we necessarily dissociate the private and the public. I think we can do things in partnership, that is to say … bring the skills of certain private companies, with the safeguards of the public. […] [T]he investment that certain private companies can bring, they may be necessary in the public domain. And with this partnership, the public is there to set […] the framework and to regulate the stuff a bit, to make sure that we don't get too far away from this framework." (FG3, translated by FR)

Across the different focus group localities, participants brought forward similar arguments even though the call for competition and liberalization of the energy market was stronger in more urban municipalities than in rural ones. As Table 2 shows, focus group participants mostly related roles and responsibilities to *steering* governance styles for values that are of an economic nature (grouped in the public value cluster **values pertaining to regulatory functions**). For all four public values composing this cluster, the focus group participants evoked governance styles similar to NPM.

Other governance styles are less easily attributable to either form of public management, such as the classic role of **granting access to information**, which is equally important for *steering* paradigms as for *serving* paradigms. According to the residents, the public authority should inform them on several levels: generally, about what actions are going on in the municipality; more specifically, about what actions the population may undertake; and finally, how these actions can be undertaken. Thus, information may be provided as a way of providing support and recommendations, as well as collaborating with the municipality. These nuances allow for a distinction between ways of granting information pertaining more to *steering* governance forms and the ones belonging to *serving* forms. The topics discussed in relation to information provision are very broad and differ depending on the dominant governance form. More than for other public values relating to roles and responsibilities, granting information linked to geothermal energy specifically was a primary concern for the focus group participants. The discussants wanted to know what the geothermal program is all about, who the involved actors were, whether there are any risks associated with it, and in what way the Genevan geothermal program is different from the two failed projects in other parts of Switzerland they had heard about. All this information should come from the public authority, making it the primary source for information on this renewable energy strategy. The public values **granting access to information** and **reassuring** are closely linked, and, not surprisingly, both predominantly relate to *serving* governance styles and refer to discussions on geothermal energy. The same applies to the other public values coded under the **values pertaining to the relationship with the public** cluster.

Focus group participants did not mention many public values in connection with which the government should take on a *rowing* attitude. However, when they did mention *rowing* public management forms, they often did so with a negative connotation. For example, in one municipality, the discussion repeatedly revolved around a planned natural gas project on municipal territory. The local focus group participants

painted a *rowing* image of the public authorities, claiming that they did not make it possible for the people living in the immediate vicinity of the gas plant to be connected to the plant despite their interest, because this had not been part of the initial plan. The decisions around the gas plant were made unilaterally and top-down with a predefined objective.

## 5. Discussion

In the findings presented above, we have discussed driving and constraining values regarding public action as well as values related to the roles and responsibilities of the state. In the following section, we discuss what this means for designing public policies and actions in the context of energy transition.

There are several values driving or constraining the authorities' sphere of influence and capacity to act. Four of the eight identified public value clusters came up repeatedly: **environmental sustainability, localness, economic benefits,** and **thinking beyond political constraints**. We argue that these four public value clusters are present across different energy transition contexts. Including these public values in public discourse and having a strategy of how to do justice to these issues may help a public authority to keep the public on board and respond to its expectations.

Even though these drivers and constraints may apply to different energy transition settings, we show that paying careful attention to the local context is crucial to understanding the public's perception of the role of the local authority accurately. Interpretation of the drivers and constraints of public authority actions is only complete when undertaken with close consideration of local conditions. For instance, consideration of the value cluster **environmental sustainability** entails that the environmental impact of geothermal drilling operations and its comparison with other renewable energy sources are in play in the background. Looking at the **localness** cluster in the context of geothermal, the anchoring idea comes strongly into play: while it is true that hydrothermal technology requires the anchoring of a project spatially in existing water aquifers, far beyond focusing solely on one particular technology, the public authority needs to attest that the local potential of the resource is part of their considerations and that decisions are anchored in this potential. Concerning **economic benefits**, a clear vision of the costs of geothermal energy as well as their burden on different stakeholders is necessary to understand this value cluster. Geothermal energy is a renewable energy source that requires heavy investments in the starting phase, especially when drilling exploratory wells. Furthermore, profitability is in no way guaranteed as the resource exploitability linked to quality of water flow and temperature is uncertain before starting a project (Compernolle et al., 2019). As new technologies and innovations in general often involve huge upfront costs (Hall and Khan, 2003), a long-term vision is crucial. In contrast to private companies, the authorities and the publicly owned utility have the considerable advantage of being able to work with long-term financial perspectives.

Public values linked to **thinking beyond political constraints** will come up in any context. For Switzerland, two key factors to keep in mind that are linked to this value cluster are certainly the direct democracy and multi-party system and what they imply for the citizens. The values on **familiarity** and **thinking beyond political constraints** are closely related because of the Swiss direct democratic system. The politicians that the residents elect and their political parties (of which they might even be active members) are immediately accessible to the voters. Swiss citizens are used to voting several times a year on issues and every couple of years for politicians. In almost all cantons and municipalities, citizens directly elect the executive branch, which makes the political issues and power plays much more tangible and personal, with expectations and hopes linked to different party members and parties. It is not just any politician or party making decisions in the name of the public; it is the politician or party the Swiss citizens voted for or against. Thus, they feel they share some of the responsibility. This element emerged clearly in the focus group discussions. Furthermore, there is a difference between expectations of the state in the different linguistic regions (Ladner, 2010). The institutional context matters substantially—there are contexts or places where citizens have more trust in the political authorities of the municipality or feel they are able to influence local politics democratically (Ladner and Bühlmann, 2007).

Further expanding on the **thinking beyond political constraints** value cluster, in the context of geothermal in Geneva, considering the identified public value of **publicness** is particularly relevant as the local authorities and the public utility have a quasi-monopoly on the exploration of geothermal. There is a tension between trying to anchor a program locally by giving the mandate to locally established actors and guaranteeing the rules of a free market economy. Even though, in theory, the market would be open to other actors to exploit geothermal heat, the canton has mandated the public utility to assess the geothermal potential of the canton. Thus, the public utility is the main actor in the geothermal development of the territory, having collected all key information and developed expertise. Although the data collected by the public utility is open access, its interpretation and the expertise acquired provides the utility with an advantage compared to other operators who want to enter the market. A second tension at the intersection between the **thinking beyond political constraints** and **publicness** value clusters is that on the one hand, the "public" nature of the authorities and the utility is ideal for long-term investments and projects, but on the other hand, it is subject to political insecurity linked to election cycles. These issues are of pressing concern to the geothermal program team, and they revealed some tensions between the need to comply with regulations on public tendering and the risk of having other actors exploit geothermal resources in a way that they consider might no longer be sustainable. The geothermal program team thus often discussed in their meetings how to organize the governance of the geothermal program in order to make it acceptable to the public.

Analyzing our focus group data and looking deeper into the public values associated with the roles and responsibilities of the authorities, we drew parallels between these public values and public management forms. We identified public values linked to old public management, NPM, and, finally, New Public Service forms. We observed that key principles pertaining to all three management forms are present in the public values related to the development of geothermal energy. Some public values are linked to *rowing* (i.e., controlling citizen's actions in a centralized way). For others, it is about *steering* (i.e., making economic and efficiency-driven decisions). Still others imply that the role of the authority is to *serve* and provide in accordance with the actual needs of the citizens. Conversations in our focus group switched between *rowing*, *steering,* and *serving* discourses, depending on the topic in question. For some topics, the attribution to one of the three governance forms was straightforward (for example, references to regulation or deregulation described actions of the government with a dominant *steering* character). Other topics demand a more nuanced analysis of the appropriate governance form. The high number of references to public values related to the *steering* role of government do not necessarily mean that it is the most desired form of government, but rather highlights its contested nature.

Trying to be flexible between different governance styles and instruments is a challenge the authority needs to face in order to choose the right role for different purposes. This can be done by anchoring public policies in public values, thus opting for the appropriate means to assure its decisions actually resonate with the population. For example, working toward the public value of **energy efficiency**, in instances where information is insufficient to change behavior, the authorities may use their power to regulate, compel, prohibit, or make the population pay through financial incentives. The chosen strategy to integrate public values into government actions may take different forms, referring to what de Bruijn and Dicke describe as safeguarding mechanisms or the institutionalization of public values (de Bruijn and Dicke, 2006). This essentially depends on the type and scope of public values and

requires case-by-case assessment.

## 6. Conclusion and policy implications

In the framework explored, we have shown the public values that drive and constrain public actions for geothermal energy development. There is a variety of public values that highlight different aspects to be considered by geothermal energy developers or authorities in charge of geothermal projects. Anchoring public actions in given contexts by interpreting the public values in their respective local settings leads to public interventions that are well suited to the topic and location in question. For instance, the geothermal program should address economic aspects such as the competitiveness of the canton or saving (public and private) on costs but, at the same time, take into account other aspects such as the reliability of the technological system or its environmental impact. To address these values, the authorities must adopt different roles that relate to different conceptions of public management, sometimes acting as a driving force, while in other situations, handing over responsibilities to other actors. In times of systemic change such as energy transition, this is a major challenge for authorities in charge of renewable energy strategies, especially when many governments have moved away from state involvement toward privatized or liberalized energy markets (Fouquet and Pearson, 2012). Working together with the public by means of deliberative or participatory processes enables the authorities to openly discuss these challenges and co-create responsible and just energy policies anchored in public values (Robinson et al., 2020).

Our findings show the importance of information, especially in times of significant change as with energy transitions. Discussing the choices and policies openly and showing that they are based on public values that are shared by the residents brings valuable benefits. If information is provided transparently and adapted to the local context, this leads to increased trust and legitimacy. Public trust in energy-related institutional actors could influence energy transitions substantially (Becker et al., 2019). Specifically for new technologies such as geothermal energy, advancing discussions can help to address fears, clarify unknowns, and disentangle controversies in a fruitful way (Swierstra et al., 2009). Furthermore, recognizing one's own values in public discourse, and identifying oneself in it, renders people more likely to cooperate or accept complicated decisions. For the authority, incorporating the public's values expands the knowledge base for making decisions on energy transition pathways (Butler et al., 2015).

Finally, and in concrete terms, policy makers and officials working on the development and promotion of new energy technologies should identify the public values at stake. Doing so allows for the development of a strategic approach starting with an assessment of which public values a local energy program needs to respond to and whether some of them have already been taken up in existing policies. A second step consists in discussing what role the authority might or should play and how to ensure that the public values are addressed. Anchoring the geothermal program in these public values adds a degree of legitimacy to the technology and program in question. However, a careful reevaluation of public values and their adequacy needs to be conducted over time, as public values are not static (Taebi et al., 2014) and the desired outcomes pertaining to public values evolve continually (Bozeman and Moulton, 2011; de Bruijn and Dicke, 2006), depending on ongoing controversies or new developments that might unfold (Cuppen et al., 2020). The same goes for energy project managers whose projects might benefit greatly by considering the public's perspectives and thus designing participation processes accordingly (Ruef et al., 2020). Highlighting the importance of public values in good practice guidelines can help stakeholders to understand and address a public issue in its overall complexity by respecting its different value sets and dimensions.

## Funding

This work was supported by the Canton of Geneva and the Services Industriels de Genève as part of the project "Territorialiser la géothermie à Genève"; and the Swiss Innovation Agency Innosuisse.

## CRediT authorship contribution statement

**Franziska Ruef:** Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft. **Olivier Ejderyan:** Conceptualization, Formal analysis, Methodology, Writing – review & editing, Supervision, Project administration, Funding acquisition.

## Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Two of the funding organizations were also subjects of study of this research. They did not interfere with any choice in the study design; collection, analysis and interpretation of data; writing of the report; and the decision to submit the article for publication.

## Acknowledgements

We would like to thank Fabienne Sierro and Nicole Cramer for their assistance with the focus groups in Geneva, Switzerland.

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